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[0001] As well as the instant invention concerns a subject-matter, contained at least a metal or a metal alloy, its surface completely or partly a corrosion protection layer exhibits its use.
[0002] The corrosion protection plays nowadays an always important becoming roller, in particular regarding the rising requirements of the users to a still higher reliability of mechanical or electric apparatuses bottom extreme mechanical and weather-related influences.
[0003] In principle one differentiates between the active corrosion protection, with which the electrochemical basic reaction of the corrosion is to become as such suppressed, and which passive corrosion protection, mechanical from each other separate with which the too protective subject-matter from metal and the corrosive means become by a corrosion protection layer.
[0004] Such corrosion protection layers are well known. Corrosion protection layers very often become obtained by applying a metal (to chromium-plate, nickel plating), a conversion layer (to chromate, phosphatizing), a polymer layer or also an enamel layer.
[0005] Meanwhile also still other requirements become to the corrosion protection layer provided beside the actual corrosion protection: So these layers are to exhibit a ever higher and chemical resistance mechanical in particular.
[0006] These steady increasing requirements on the part of the processing industry have to the fact guided that corrosion protection layers become nowadays not only from an homogeneous material made, but that ever more hybrid systems or multi-layer systems come to the use.
[0007] Hybrid systems from organic matrix and corrosion protection pigments are well known. Three typical impacts become distinguished regarding the corrosion protection pigments: The one pigments with physical corrosion protection effect become used. They are chemical inert and become as inactive and/or. passive pigments referred, whose impact consists of the fact that they extend the Diffusionswege for waters, oxygen and corrosion-promoting ions significant and the underground adhesion of the paint and the coating improves. An example for such a passive corrosion protection causing pigment is iron mica.
[0008] An other possibility consists in the use of pigments with chemical corrosion protection effect, which show a certain solubility and are in the layer, to stabilize certain pH values in the coating. Such pigments become as active referred. Its impact based on interactions within the boundary surface range between pigment and ground, pigment and bonding agent as well as pigment and penetrated added ions. Redox reactions can take place, so that new protective compounds can develop. By Seifenbildung with the bonding agent and/or. Neutralization of the acidic degradation products remains in the coating a certain pH value to a large extent adjusted. The corrosion-active ions eliminated become. As example zinc oxide is to be called here.
[0009] The other still pigments with electrochemical corrosion protection effect are to be called, which affect passivating those to protective metal surfaces. These corrosion protection pigments become judged thereafter whether they are in the "anodic range" or in the "cathodic range" effective. Pigments, which prevent the resolution of the metal by protective layer formation, become as referred effective in the anodic range. Pigments, which prevent the corrosion due to their high oxidation potential, become as referred effective in the cathodic range. Examples for pigments effective in the anodic range are phosphates, for pigments effective in the cathodic range are it chromates.

State of the art

[0010] Known ones are also corrosion protection pigments from combinations of phosphates with borates or silicates (call, J.: Inorganic metal protection, Vincentz publishing house, Hanover, 1993, in particular sides 248 to 289).
[0011] Particularly problematic regarding an effective corrosion protection is subject-matters, which consist of magnesium or its alloys as well as of die-cast zinc.
[0012] With magnesium and its alloys, which becomes used due to its small specific gravity frequent in the automobile, air and space industry, the corrosion is to be attributed to various particularities.
[0013] Thus magnesium becomes often referred as "unedelstes customs metal", which points to its high reactivity with water. Beyond that, particularly frequent is with Mischbauweise with steel, aluminium etc., to observe a galvanic corrosion which is to due local cells caused by irons, nickels or coppers to by contaminants. The other surfaces from magnesium or its alloys have no sufficient self passivation (as for example with aluminium) separate form only mechanical unstable oxide/hydroxide layer. Particularly often used, but unfortunately also particularly corrosion-susceptible magnesium alloy are the types mg AZ 91 (diecasting alloy) and mg AZ 31 (forgeable alloy).
[0014] With the die-cast zinc the so called "white blister" forms for bottom corrosive conditions, which from a mixture of zinc oxides and - hydroxides exists.
[0015] Particularly problematic and susceptibly is Zinkdruckgussteilen, in particular ZK 410, opposite salzhaltigen Mediums. Therefore the corrosion of die-cast zinc parts is particularly a major problem in the automotive industry.
[0016] A possibility to the corrosion protection is for the example the chromate finishing of subject-matters from magnesium or its alloys. The corresponding methods become in particular in the MIL specifications M3171 type 1 to type III described. Chromic acid or their salts becomes used the passivation. Also the use of Natriumdichromat in combination with potassium permanganate is described (Dow Chemical Treatment, No. 22). The chemical passivation by means of chromium (VI) - haltiger aqueous passivation electrolytes is simple to be accomplished. This has however the serious disadvantage that the chromathaltigen fabrics, who are contained in the formed conversion layers also are carcinogenic.
[0017] Beyond that also phosphatizing of subject-matters from magnesium or its alloys is known (see. Dow Chemical Treatment No. 18).
[0018] However the corrosion protection is smaller compared with a chromated layer substantial.
[0019] A frequent applied method to the generation of a chromate-free corrosion protection on magnesium articles, industrial in youngest past, is in the WHERE 00/56950 described.
[0020] A conversion layer becomes by passivation of the article by means of aqueous passivation electrolytes a generated, whereby the aqueous passivation electrolyte contains potassium permanganate and at least one alkali or ammonium salt of an anion from the group of vanadate, molybdate and Wolframat.
[0021] Although this conversion layer with subject-matters from magnesium and/or. Magnesium alloy an excellent corrosion protection lends, is not these results not on subject-matters from die-cast zinc to transfered, since in accordance with this method at all no conversion layers on die-cast zinc obtained to become to be able. Expensive examinations have shown the fact that the formed layer exclusive consists of the oxides and hydroxides of the alloy metals zinc, copper and aluminium and not exhibits elements of the used electrolyte.
[0022] The bottom term "conversion layer" becomes here and in the following a layer understood, which becomes not by job on a surface, but by chemical conversion (conversion) of the metallic surface and various components aqueous passivation electrolytes of the formed (see. H. Simon, M. Thoma "applied surface technique for metallic materials", Carl Hanser publishing house, Munich (1985) S. 4).
[0023] Furthermore known, essentially nanoskalige particles are into an organic to merge inorganic or organic/inorganic matrix. In this way particular characteristic combinations - as for the example transparency and wear resistance with coatings - can become by the use of nanoparticles achieved.
[0024] It is not known to insert nanoskalige particles to the improvement of the corrosion protection in hybrid systems with the surface coating of metals.
[0025] A significant problem with the use of nanoskaliger particles is that these are not present by Aneinanderlagerung of the primary particles as discrete particles, but predominant as agglomerates. Such agglomerates can reach diameters of several thousand nanometers, so that the desired, with which nano-potash towards nature of the particles linked properties are not more achievable.
[0026] Therefore it was not missing in the past at proposals to prevent the agglomeration of nanoskaliger particles by partially right expensive manufacturing processes in order to arrive in such a way at the desired characteristic profile of the hybrid systems.

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[0027] However it is to today unknown to produce on the basis of available agglomeratheltigen nano-potash towards powders with justifiable effort agglomerate-free powders or powder preparing.
[0028] From the EP 0,637,616 A1 known nanoskaliger materials dry by milled ones a Deagglomeration of the particles is to be caused. The agglomerates can become in their size on a Sechstel in such a way reduced.
[0029] Disadvantages are not however the small space/time yield as well as those contamination which can be avoided by abrasion from the along-used meal aid.
[0030] As alternative manufacture processes various methods are developed, in those on the basis of low molecular discrete or as z. B. Sols present synthesis components over a controlled growth process preparing with at least to a large extent agglomerate-free nano-potash towards particles or composites prepared to become to be able.
[0031] Thus particles can become generated, their average diameter of bottom 50 Nm lie during the Sol gelprocess on the basis of metal alkoxides by controlled structure of molecular weight. Such systems find beipielsweise as coating agents or material precursor use (e.g. The Polymeric of material Encyclopedia of 1221 volume of 6, 4782-4792).
[0032] By high technical effort, which is usually connected with such manufacture processes, so the available products only very limited are more insertable. Also such methods are more applicable only on a limited selection of chemical different product classes.
[0033] Nanoskalige metallic oxide brine are likewise known. Here and in the following bottom this definition 30 to 50%ige colloidal solutions of metal oxides (Si, aluminium, Ti, Zr, TA, Sn, Zn) in aqueous or organic mediums with average particle sizes of 4 to approximately 60 Nm understood become. By electrical and/or steric stabilization of the particle surfaces succeeds preventing such metallic oxide brine to an agglomeration. Particularly to emphasize is aqueous flint brine, which for example by ion exchange procedures from alkaline solutions prepared to become to be able (e.g. Ullmann's Encyclopedia OF Industrial Chemistry, 5. Support, tape A23, VCH publishing house, Weinheim, 1993, S. 614-629). Such products are in the trade for example bottom mark-taken like Levasil< (R)> (Companies Bayer AG) or Kleboso< (R)> (Companies Clariant) available. These nano-potash towards metallic oxide brine do not consist surface-modified nanoparticles of a colloidal solution.
[0034] The bottom designation "surface-modified" understood does not become that the surface is not hydrophobiert by Inkontaktbringen with reactive compounds (for example through opposite si-OH reactive compounds such as octamethylcyclotetrasiloxane, Octyltrimethoxysilan, hexamethyldisilazane or Dimethyldimethoxysilan). Examples for surface-modified products are Aerosil< (R)> R 102, R 202, R 805, R 812, R 962 or R 974 of the company Degussa.
[0035] In the EP-A 766,997 a method becomes the production of finely divided solid dispersions described. After this method will it possible to reach a comminution from suspended solid particles to. A Deagglomeration nano-potash towards particles and their use in lacquer bonding agents did not become of more primary here drawn in considerations. The method is in principle known as nozzle dispersion procedures and becomes for other purposes such as z. B. to the fine dispersion of not mixable liquid phases, like waters in oil, already industrial used. The production of improved 2-komponentigen aqueous lacquer emulsions by means of purify-hastier emulsification knows z. B. after the method of the EP-A 685,544 take place.
[0036] Thus the DE describes 198 11 790 A1 nanopartikelhaltige transparent lacquer bonding agents, those related to the lacquer solid body 0.5 to 25 Gew. - % of as solid trainable, primary nanoskalige particles contain, prepared by jet dispersion nano-potash towards particles in the bonding agent.
[0037] The DE 198 11 790 A1 states however that a special disadvantage of disperse solved nanoparticles is appropriate as for instance for flint brines or other metallic oxide brines in the strong tendency to the agglomeration, so that an homogeneous introduction is into foreign matrix as for instance a formulation of lacquer not so easily possible. As way out will proposed to make an homogeneous training possible into a formulation of lacquer by modification of the surface of the particles and adaptation of the solvent how it is for example in the EP 0,768,351 A1 disclosed. However this method is more insertable technical very expensive and only limited ones.
[0038] The resultant layers are scratch-more stable by the addition nano-potash towards particles, an influence on the corrosion resistance become not achieved.

Object

[0039] Object of the invention is the provision of an article from a metal or a metal alloy with an effective and chromate-free corrosion protection, which is more applicable on subject-matters from aluminium, magnesium, steel and Zinkdruckgusslegierungen. The corrosion protection effect of such a conversion layer should not be poorer beyond that, as those of the known, chromated subject-matters from magnesium or its alloys and/or. the known subject-matters from die-cast zinc.
[0040] This corrosion protection is to be in thin layers with a thickness of less than 10 [mu] m effective and not falsify the contours of the subject-matter.
[0041] The object becomes dissolved according to invention by a subject-matter, contained at least a metal or a metal alloy, whose surface exhibits a corrosion protection layer completely or partly, latter available through
a) Apply an aqueous corrosion protection solution, prepared by mixing an aqueous being, contained in aqueous colloidal solution not surface-modified nanoparticles at least one flint oil and/or metallic oxide oil, with an aqueous isocyanate solution, contained at least a Isocycanatverbindung with at least a blocked NCO group; and
b) subsequent preliminary drying, drying process, cure and/or crosslinking in step of the A) of applied layer.

[0042] The before described object becomes equally dissolved by a subject-matter, contained at least a metal or a metal alloy, its surface completely or partly
i. a corrosion protection layer, these available through
a) Apply an aqueous corrosion protection solution, prepared by mixing an aqueous being, contained in aqueous colloidal solution not surface-modified nanoparticles at least one flint oil and/or metallic oxide oil, with an aqueous isocyanate solution, contained at least a Isocycanatverbindung with at least a blocked NCO group; and
b) subsequent preliminary drying, drying process, cure and/or crosslinking in step of the A) of applied layer;
ii. and at least, on the corrosion protection layer located metallic or non-metallic layer
exhibits.
[0043] The corresponding instant invention can subject-matters obtained for the first time become, which are particularly corrosion resistant industrial far common and. Simultaneous ones are loadable the subject-matters according to invention mechanical high and fulfill salt-sprayed according to DIN 50 to the,021.
[0044] Beyond that is a substantial particularity of the layer according to invention that only very thin layer thickness of the corrosion protection layer is necessary, in order to fulfill the requirements mentioned. For example still if layer thickness of at least 30 [mu] m is necessary for the passive corrosion protection of particularly susceptible magnesium alloy in accordance with the state of the art, then a better corrosion protection already becomes with a layer thickness of the corrosion protection layer of bottom 5 [mu] m achieved with the corrosion protection layer according to invention.
[0045] The before described object becomes just as dissolved by a subject-matter, contained at least a metal or a metal alloy, its surface completely or partly
i. a corrosion protection layer, these available through
a) Apply an aqueous corrosion protection solution, prepared by mixing an aqueous being, contained in aqueous colloidal solution not surface-modified nanoparticles at least one flint oil and/or metallic oxide oil, with an aqueous isocyanate solution, contained at least a Isocycanatverbindung with at least a blocked NCO group; and
b) subsequent preliminary drying, drying process, cure and/or crosslinking in step of the A) of applied layer;
ii. and at least, a metallic or non-metallic layer located between the metal or the metal alloy and the corrosion protection layer
exhibits.
[0046] This embodiment concerns such subject-matters, with those the metallic or non-metallic layer located between the metal or the metal alloy and the corrosion protection layer alone neither the corrosion protection, nor the mechanical resistance achieved.
[0047] Such a subject-matter offers the possibility for the first time beside the advantages specified before to manufacture on aluminium complete UVstable, jet black and wear resistant layers. UVstable and jet black layers are known and become for example using antimonhaltiger electrolytes prepared, like them the for example bottom designation "Black Magic< (R)> RT-A3 " of the company Hubbard Hall sold become. The serious disadvantage that these black layers with a soft cloth simple wiped to become to be able, repaired by this multi-layer structure according to invention complete. By pretreatment of an article from aluminium (for example an optical component for Beamer) with the antimonhaltigen solutions of the state of the art, a short intermediate drying, treatment with the before described corrosion protection solution and subsequent drying process with 120 [deg.] C for 30 minutes becomes a subject-matter obtained, both the mechanical stresses and the UV resistance satisfied required of the industry.
[0048] With the metallic layer located on the corrosion protection layer it acts in accordance with one particularly preferable embodiment around one external currentless deposited layer of a metal, in particular of coppers, nickels and/or tin, or its alloys.
▲ top [0049] Such metal layers deposited on the non-metallic corrosion protection layer are particularly good after methods described in the German patent application DE 103 17 795 A1 and DE 103 17 196 A1 producible.

[0050] The non-metallic layer located on the corrosion protection layer is favourable-proves available by film formation and/or crosslinking of a solution or a dispersion, which contains at least a polymer.
[0051] In accordance with one preferable embodiment of the instant invention the metal is particularly a barrier layer-formed metal, in particular a light metal from the group of aluminium, magnesium and titanium.
[0052] Depending upon operational area of the article according to invention this is from a metal alloy, which contains at least a barrier layer-formed metal. In particular it acts thereby around a light metal out of the group of aluminium, magnesium and titanium, and whole particularly prefered around a kneading, a casting or a diecasting alloy out of magnesium or aluminium.
[0053] Particularly good insertable magnesium alloys are AZ91, AZ61, AM60, AM50, AM20, AS41, AS21, AE42, QE22, ZE41, ZK61 and AZ31, AZ60, ZK31, ZK60, WE43 and WE54 (designations after ASTM).
[0054] It is a corresponding other embodiment according to invention also possible that itself between the metal and/or. the metal alloy and the corrosion protection layer a barrier layer finds, which contains at least an oxide of the metal.
[0055] This barrier layer can be available by a external currentless, electrolytic and/or plasma-chemical method.
[0056] This barrier layer exhibits channel-like pores, which lead to an adhesion of the corrosion protection layer on the metal, improved again.
[0057] In accordance with one preferable embodiment of the instant invention the metal is particularly selected is from the group of irons, zinc, tin, copper and silver.
[0058] Corresponding one preferable embodiment of the instant invention is likewise particularly the metal alloy selected from the group of steel alloys and Zink-Druckgusslegierungen. As steel alloys particularly cold rolled steels are to be called, for example SOW 1010. As Zinkdruckgusslegierung ZK 410 is to be particularly called.
[0059] In addition, it is possible that between the metal (or the metal alloy) and the corrosion protection layer an additional interlayer is, which contains at least an oxide and/or a phosphate of the metal.
[0060] In this way pre treated metallic workpieces can become already by applying the corrosion protection solution treated with a commercial far common corrosion protection, without the commercial corrosion protection layer must become remote.
[0061] Beyond that known corrosion protection layers, which direct on the metal are, can cause a synergetic effect in accordance with this embodiment: Example meadow shows a subject-matter from magnesium, whose metallic surface with In the WHERE 00/56950 described a conversion protective layer is provided, after the treatment with the before described corrosion protection solution of the instant invention, followed of preliminary drying, drying process, cure and/or crosslinking of the applied corrosion protection layer best results, which without or only with a conversion layer in accordance with the WHERE 00/56950 not achieved become could.
[0062] This interlayer can be available by an electrolytic and/or external currentless method.
[0063] When electrolytic processes are suitable and as external currentless methods particularly such, at which with chrome-acidic electrolytes one works.
[0064] In accordance with one the isocyanate compound particularly does not point self-branched properties to preferable embodiment of the instant invention exhibits, i.e. the isocyanate compound is not self-branched.
[0065] The bottom term here and in the following such isocyanate compounds understood, the still other, in relation to the own isocyanate remainders reactive groups become "self-branched" (like e.g. Hydroxyl groups) exhibit, and which react to bottom formation of intermolecular polymer networks without presence other components.
[0066] With respect to the contrast in addition one differentiates isocyanate compound with crosslinking properties: Here it concerns such compounds, those with an additional, in relation to isocyanate remainders reactive groups exhibiting component (the also bottom term "bonding agent" known), bottom formation of intermolecular polymer networks responsive.
[0067] Such embodiments place safer that the prepared corrosion protection solution exhibits an extreme high processing time (pot life). So the corresponding invention pot lives of more than six months (with room temperature) can become achieved with the corrosion protection solution. Beside this advantage it becomes the other ensured that no crosslinked particles in the isocyanate solution (and thus in the corrosion protection solution) in such an amount can form that the adhesion between metal, barrier layer or interlayer and the corrosion protection layer becomes affected.
[0068] In particular with subject-matters from barrier layer-formed metals the presence of crosslinked particles with isocyanate function has very negative influence on the adhesion properties of the resultant corrosion protection layer.
[0069] It is particularly favourable, if the isocyanate solution beside the isocyanate compound does not contain other film-formed and/or cross-linkingable compounds.
[0070] Thereby effective prevented becomes that crosslinked particles, in particular become formed after longer leaving of the corrosion protection solution untouched.
[0071] Whole particularly prefered acts it during the isocyanate solution around a water-dilutable polyurethane dispersion, in particular with an equivalent weight between 900 and 1.200 and a theoretical calculated content at blocked NCO groups between 3 and 8%.
[0072] Such isocyanate solutions are the for example bottom trade name Bayhydur< (R)> BL 5140 (companies Bayer AG) as hardener component in the lacquer industry common.
[0073] Favourable way has the isocyanate solution a pH value between 8 and 10.
[0074] In an other preferable embodiment of the instant invention the isocyanate solution points a non volatile portion after DIN EN ISO 3251 (1 g/1 h 105 [deg.]C) between 15 and 25% up. Thereby achieved becomes that the corrosion protection solution available by mixing the being and isocyanate solution by simple order procedures, like e.g. Immersion or syringes) on the too protective surface applied will can, whereby the resultant corrosion protection layer - beside the before described advantages - is very uniform formed, independent of the geometry of the article.
[0075] In an other preferable embodiment of the instant invention the isocyanate compound does not exhibit free NCO groups.
[0076] By choice of a corresponding starting compound ensured becomes on very much simple manner that it comes to no formation of crosslinked or self-branched particles (the also bottom name of "microgels" or "micro particle" known).
[0077] In accordance with one the being and/or the isocyanate solution likewise contains additional non-metallic particles of preferable embodiment of the instant invention, in particular with a size of less than 100 Nm.
[0078] This embodiment concerns in particular such corrosion protection layers, which must fulfill other application scope beside the corrosion protection still another.
[0079] The non-metallic particles can exhibit an hardness of more than 1,500 HV and be selected from the group of silicon carbide, corundum, diamond and Tetraborcarbid.
[0080] Such non-metallic particles will have to be selected whenever the corrosion protection layer according to invention high mechanical stresses like e.g. Abrasion, exposed are.
[0081] In addition, the non-metallic particles can friction-decreasing properties exhibit and selected be from the group of the fluoropolymers and by polytetrafluorethylene, PFA, molybdenum sulfide, cubic boron nitride and Zinnsulfid.
[0082] Into this cases the non-metallic particles of the corrosion protection layer according to invention lend self lubrication characteristics, which work against an early mechanical wear of the article according to invention.
[0083] The non-metallic particles can exhibit likewise a photo-catalytic activity and be in particular from anatases. With anatases it acts around a tetragonal holoedrische modification of titanium dioxide.
[0084] Into this cases a corrosion protection layer becomes obtained, which has beyond that also still desodorierende properties. Applications for such subject-matters are in particular kitchen devices and medical devices.
[0085] The being and/or the isocyanate solution can contain however also according to invention additional still metallic particles.
[0086] These metallic particles are not in a preferable embodiment of the instant invention from light metal or a Leichtmetallegierung, have in particular a size between 0,5 and 1 [mu] m and are particularly prefered from coppers and/or silver.
[0087] Contrary to the dominant opinion, so the addition of copper particles promotes the formation of local cells and thus the corrosion, the presence of this metallic particles in the present case leads to it that the corrosion protection is again improved, in particular with subject-matters from magnesium.
[0088] In addition, it is possible that exhibits the being and/or the isocyanate solution a pH value of more than 8 and that the metallic particles from a light metal or a Leichtmetallegierung are, in particular a size between 0,5 and 10 [mu] m it exhibit and particularly prefered magnesium and/or contain aluminium. In case of of aluminum particle the pH value should not amount to any more than 9.
[0089] The corrosion protection is again improved also here by these light alloy particles. Particularly with subject-matters from steel this advantage is to be observed.
[0090] In accordance with one the being and/or the isocyanate solution likewise contains an additional water-soluble dye of preferable embodiment of the instant invention.
[0091] Particularly a water-soluble dye using in the sense of the instant invention is a metal complex dye, like it the for example bottom trade designation Neozapon< (R)> of the company BASF, Orasol< (R)> of the company Ciba-Geigy, Savinyl< (R)> of the company Sandoz or Lamponol<

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(R)> of the company ICI sold becomes.
[0092] In an other, preferable embodiment the being and/or the isocyanate solution contains an additional corrosion protection pigment of the instant invention, in particular with physical corrosion protection effect.
[0093] Particularly suitable corrosion protection pigments are iron mica, soot and graphite.
[0094] Corresponding one particularly preferable embodiment of the instant invention becomes the subject-matter according to invention in the automotive industry, electrical and electronics industry, Maschinenbauindustrie, air and space travel used.
[0095] To call are in particular parts of motors and gear boxes, instrument panels, doors and parts of it, steering gear housing, wheel stars for motorcycles, butterfly valve housing, receiving devices for cutters, rotors or restrictor housings for compressors, sealing jaws for packing machines, parts for contact strips and electrical connectors, bulb holders, lamp housings, rotor housings of helicopters, and housings for electric apparatuses.

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Result Page

1. Subject-matter, contained at least a metal or a metal alloy, whose surface exhibits a corrosion protection layer completely or partly, latter available through
a) Apply an aqueous corrosion protection solution, prepared by mixing an aqueous being, contained in aqueous colloidal solution not surface-modified nanoparticles at least one flint oil and/or metallic oxide oil, with an aqueous isocyanate solution, contained at least a Isocycanatverbindung with at least a blocked NCO group; and
b) subsequent preliminary drying, drying process, cure and/or crosslinking in step of the A) of applied layer.
2. Subject-matter, contained at least a metal or a metal alloy, its surface completely or partly
i. a corrosion protection layer, these available through
a) Apply an aqueous corrosion protection solution, prepared by mixing an aqueous being, contained in aqueous colloidal solution not surface-modified nanoparticles at least one flint oil and/or metallic oxide oil, with an aqueous isocyanate solution, contained at least a Isocycanatverbindung with at least a blocked NCO group; and
b) subsequent preliminary drying, drying process, cure and/or crosslinking in step of the A) of applied layer;
ii. and at least, on the corrosion protection layer located metallic or non-metallic layer
exhibits.
3. Subject-matter, contained at least a metal or a metal alloy, its surface completely or partly
i. a corrosion protection layer, these available through
a) Apply an aqueous corrosion protection solution, prepared by mixing an aqueous being, contained in aqueous colloidal solution not surface-modified nanoparticles at least one flint oil and/or metallic oxide oil, with an aqueous isocyanate solution, contained at least a Isocycanatverbindung with at least a blocked NCO group; and
b) subsequent preliminary drying, drying process, cure and/or crosslinking in step of the A) of applied layer;
ii. and at least, a metallic or non-metallic layer located between the metal or the metal alloy and the corrosion protection layer
exhibits.
4. Subject-matter according to claim 2 or 3, characterised in that the metallic layer one located on the corrosion protection layer deposited layer of a metal, in particular of coppers, nickels and/or tin, or its alloys is external currentless.
5. Subject-matter according to claim 2 or 3, characterised in that the non-metallic layer by film formation and/or crosslinking of a solution or a dispersion, located on the corrosion protection layer, is, which contains at least a polymer.
6. Subject-matter after one of the preceding claims, characterised in that the metal a barrier layer-formed metal, in particular a light metal from the group of aluminium, magnesium and titanium, is.
7. Subject-matter after one of the claims 1 to 6, characterised in that the metal alloy at least a barrier layer-formed metal, in particular a light metal from the group of aluminium, magnesium and titanium contains, and a particularly prefered kneading, casting or diecasting alloy from magnesium or aluminium are.
8. Subject-matter according to claim 6 or 7, characterised in that itself between the metal and/or. the metal alloy and the corrosion protection layer a barrier layer finds, which contains at least an oxide of the metal.
9. Subject-matter after one of the claims 6 to 8, characterised in that the barrier layer available is by a external currentless, electrolytic and/or plasma-chemical method.
10. Subject-matter after one of the claims 1 to 5, characterised in that the metal selected is from the group of irons, zinc, tin, copper and silver.
11. Subject-matter after one of the claims 1 to 5, characterised in that the metal alloy selected is from the group of steel alloys and Zink-Druckgusslegierungen.
12. Subject-matter according to claim 10 or 11, characterised in that itself between the metal and/or. the metal alloy and the corrosion protection layer an interlayer finds, which contains at least an oxide and/or a phosphate of the metal.
13. Subject-matter according to claim 2, characterised in that the interlayer available is by an electrolytic and/or external currentless method.
14. Subject-matter after one of the preceding claims, characterised in that the isocyanate compound no self-branched properties exhibits.
15. Subject-matter after one of the preceding claims, characterised in that the isocyanate solution beside the isocyanate compound no other film-formed and/or cross-linkingable compounds contains.
16. Subject-matter after one of the preceding claims, characterised in that the isocyanate solution a water-dilutable polyurethane dispersion is, in particular with an equivalent weight between 900 and 1.200 and a theoretical calculated content at blocked NCO groups between 3 and 8%.
17. Subject-matter after one of the preceding claims, characterised in that the isocyanate solution a pH value between 8 and 10 exhibits.
18. Subject-matter after one of the preceding claims, characterised in that the isocyanate solution a non volatile portion according to DIN EN ISO 3251 (1 g/i h 105 [deg.]C) between 15 and 25% exhibits.
19. Subject-matter after one of the preceding claims, characterised in that the isocyanate compound no free NCO groups exhibits.
20. Subject-matter after one of the preceding claims, characterised in that the being and/or the isocyanate solution of additional non-metallic particles, in particular with a size of less than 100 Nm, contains.
21. Exhibit subject-matter according to claim 20, characterised in that the non-metallic particles an hardness of more than 1,500 HV and are selected in particular from the group of silicon carbide, corundum, diamond and Tetraborcarbid.
22. Exhibit subject-matter according to claim 20, characterised in that the non-metallic particles friction-decreasing properties and are selected in particular from the group of the fluoropolymers and from polytetrafluoroethylene, PFA, molybdenum sulfide, cubic boron nitride and Zinnsulfid.
23. Subject-matter according to claim 20, characterised in that the non-metallic particles a photo-catalytic activity exhibit and in particular from anatases are.
24. Subject-matter after one of the preceding claims, characterised in that the being and/or the isocyanate solution of additional metallic particles contains.
25. Subject-matter according to claim 24, characterised in that the metallic particles not from light metal or a Leichtmetalllegierung are, in particular a size between 0,5 and 1 [mu] m exhibit and particularly prefered coppers and/or silver contained.
26. Subject-matter according to claim 24, characterised in that the being and/or the isocyanate solution a pH value of more than 8 exhibits and that the metallic particles from a light metal or a Leichtmetalllegierung are, in particular and particularly prefered magnesium and/or aluminium exhibit a size between 0,5 and 10 [mu] m contained.
27. Subject-matter after one of the preceding claims, characterised in that the being and/or the isocyanate solution an additional water-soluble dye contains.
28. Subject-matter after one of the preceding claims, characterised in that the being and/or the isocyanate solution an additional corrosion protection pigment, in particular with physical corrosion protection effect, contains.
29. Use of a subject-matter after one of the preceding claims in the automotive industry, electrical and electronics industry, Maschinenbauindustrie, air and space travel.

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